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LMOP Conference
January 6-7, 2003

www.ingenco.com

Richmond, Virginia

Dispatchable Landfill Gas Burning Electric Generating Plants

- **What is a Dispatchable Plant?**
- **Why Build One?**

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A Dispatchable Plant has the level of output and hours of operation controlled by the customer <u>receiving</u> the power, not the generator <u>producing</u> the power.

Dispatcher managing generation

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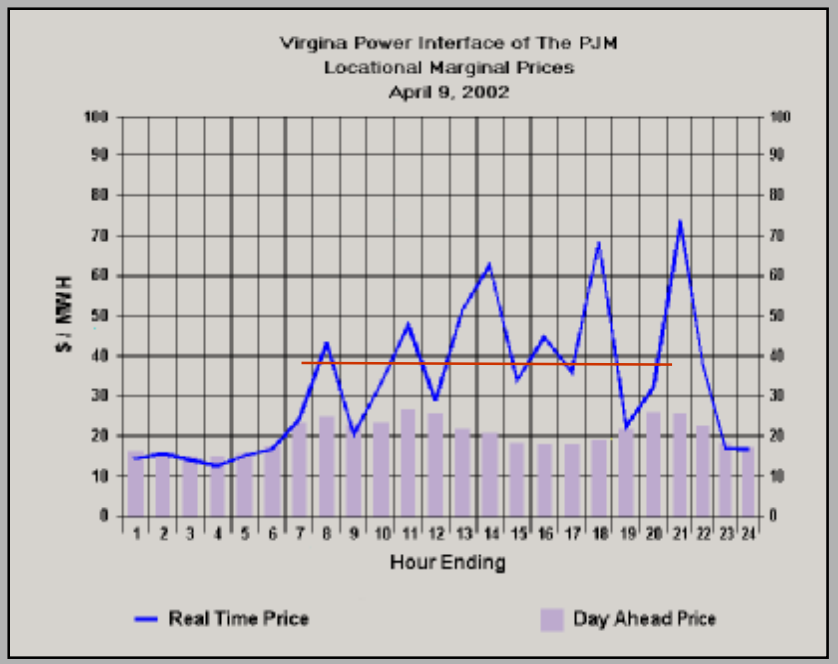
The production of gas by a landfill is relatively constant hour by hour



But the price of power fluctuates widely

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Power Prices in the Good Old Days

- **PURPA based projects had price based on "Avoided Cost"**
- **Long term agreements were available**

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Pricing Under Deregulation

- **Utilities no longer guaranteed rate of return or captive customer base**
- **Unwilling to purchase power above real time cost**
- **Long term agreements unpopular**

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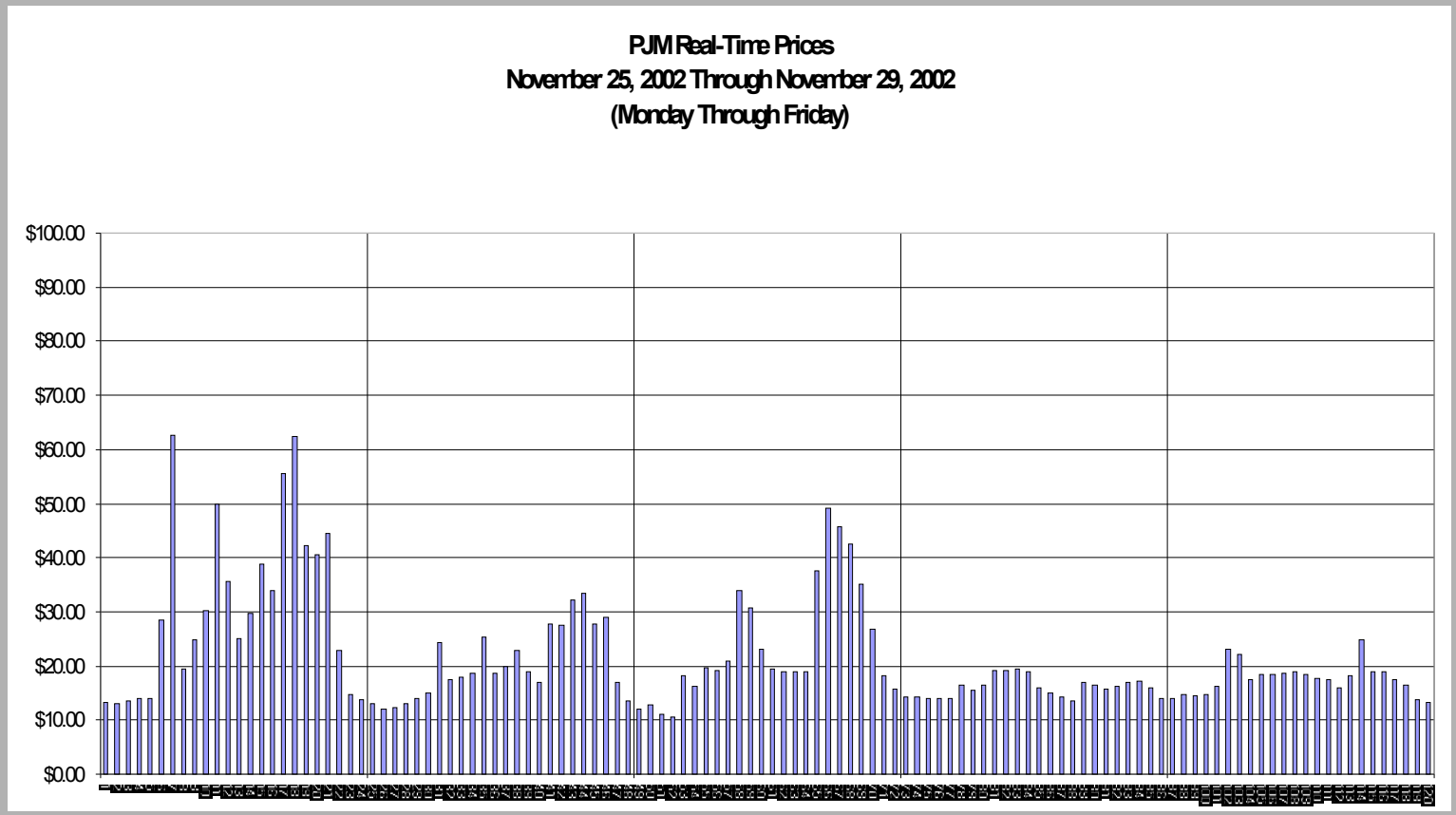
Current Market Pricing



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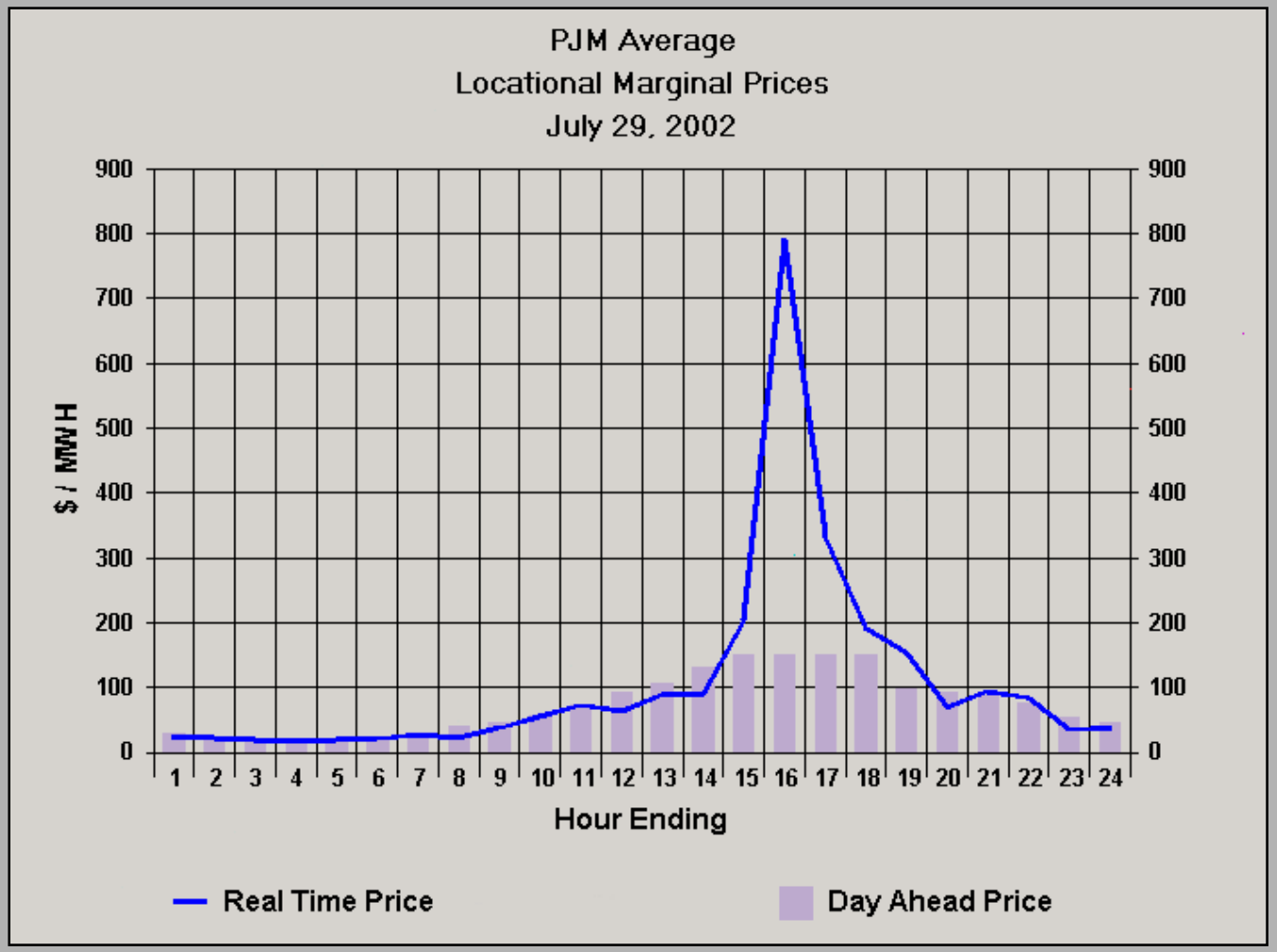
Volatility of Pricing



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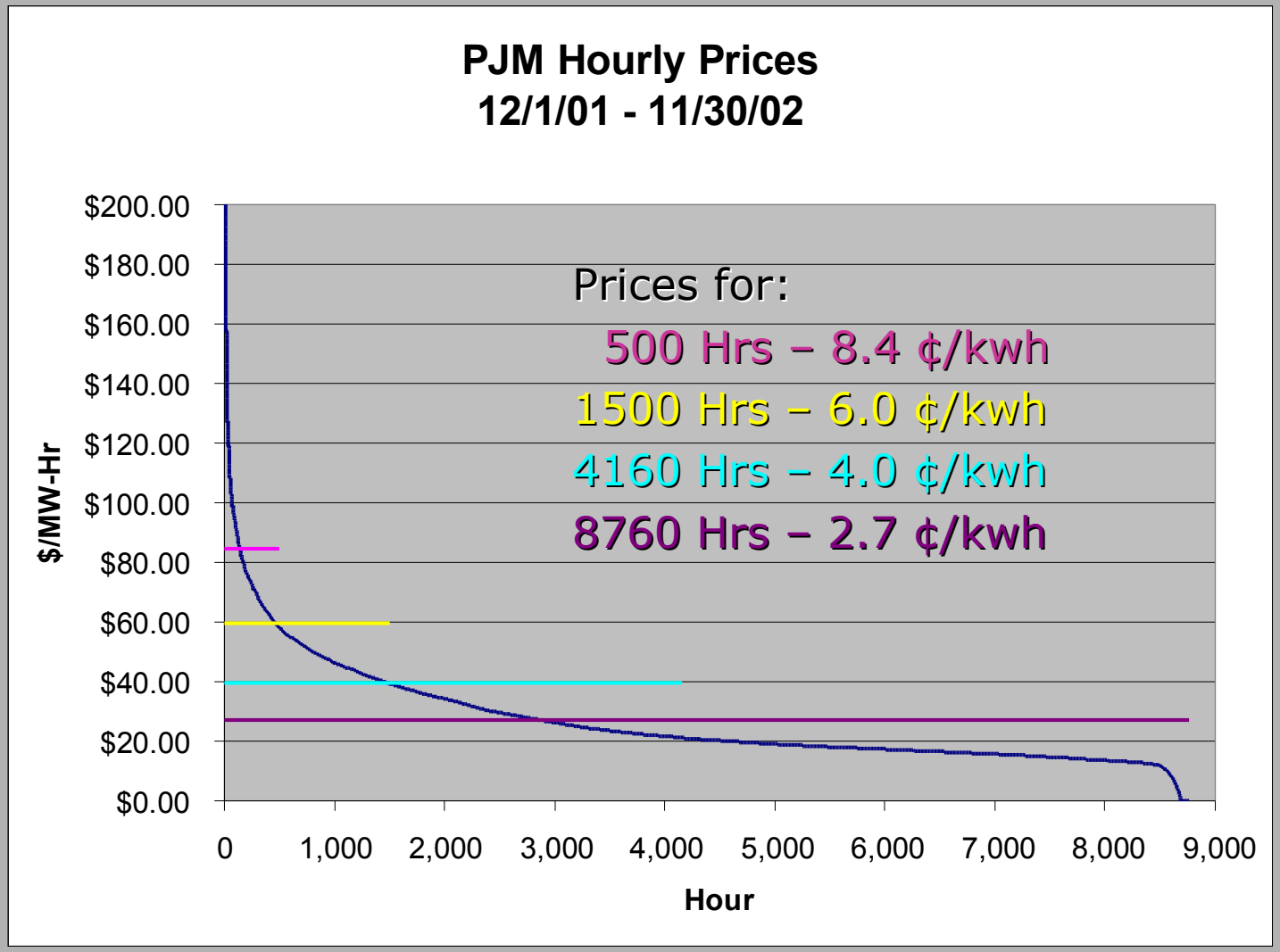
Annual Power Prices



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The Keys to LFG-to-Electricity Development in Current Market

- **Increase Product Value**
- **Decrease Product Cost**

DUH!

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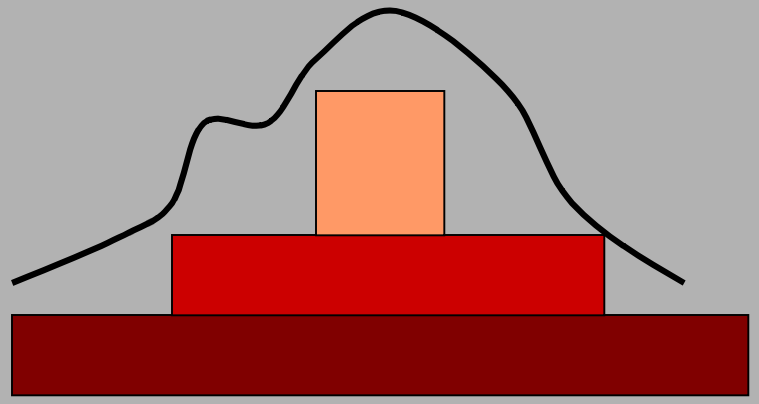
Increasing the Product Value

- **Rapid Dispatch**
  - Spinning reserve credit
- **Load Following**
  - Filling in the gaps in block loads



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Increasing the Product Value

- **Optionality Value**

  The ability to shut down if real time prices crash

- **Capacity Value**

  Payment for just being available to run

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Policy Based Enhancement

- **Green Premiums**
- **State Mandates for Green Percentage in Portfolio**
- **Production Tax Credits**

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Reducing the Cost of Landfill Gas Generation Technology

- **Gas Turbines**
- **Spark Ignited Reciprocating Engines**
- **Dual Fueled, Compression Ignition (Diesel) Engines**

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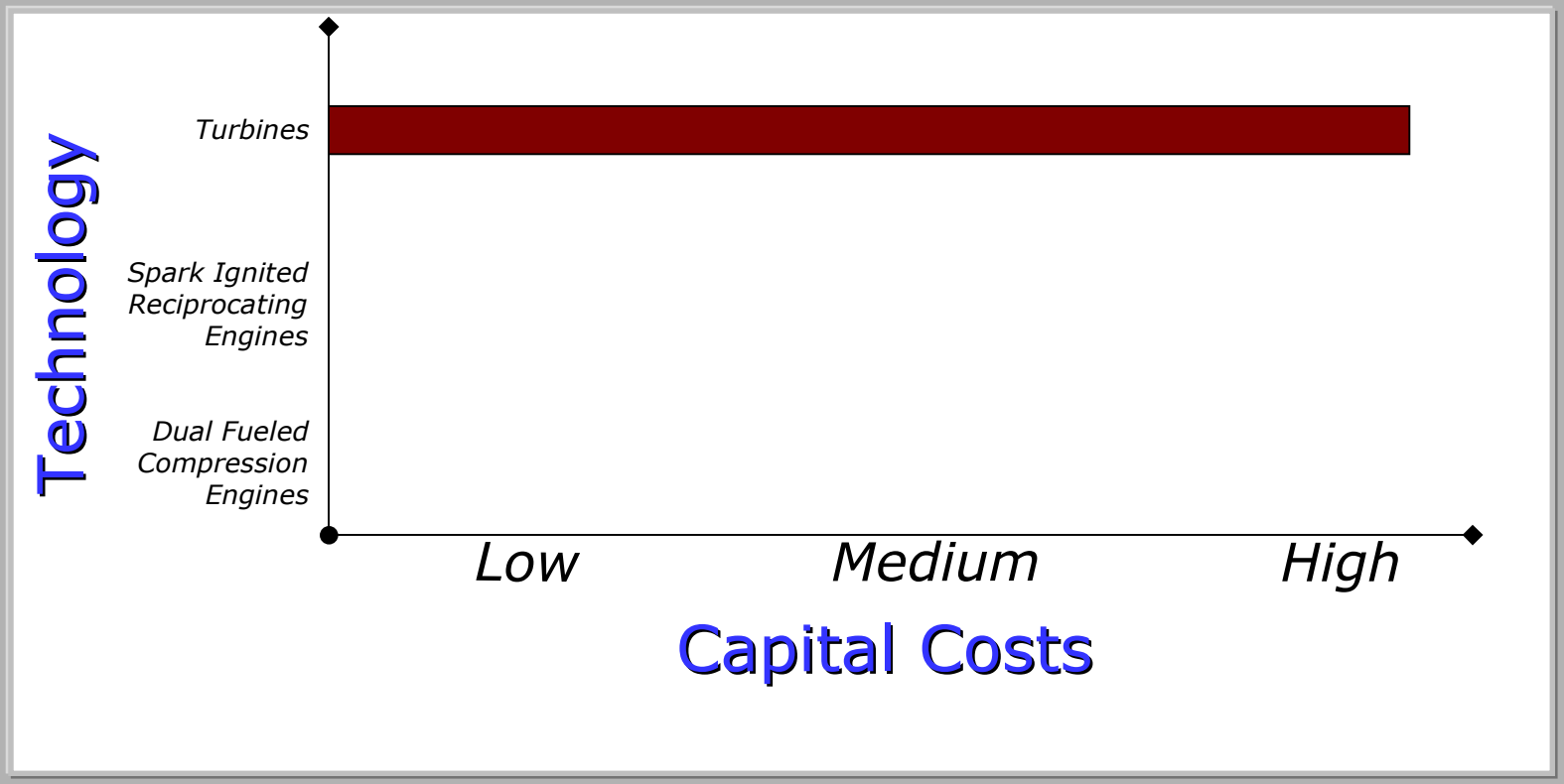
Capital Cost Comparison

Turbines have the highest capital cost. At Landfills best used for base load operation because of poor part load capability.



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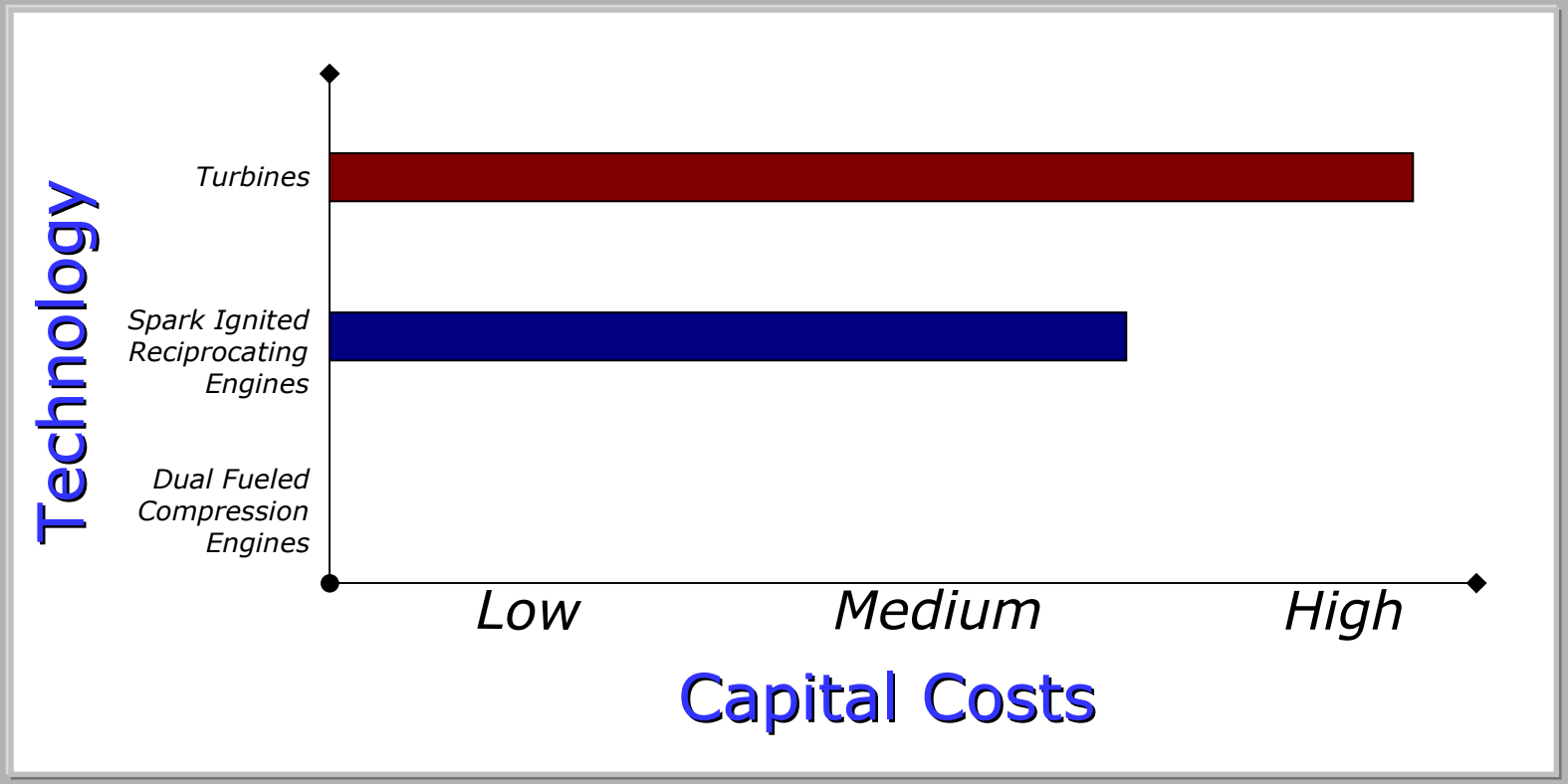
Capital Cost Comparison

Spark ignited reciprocating engines have medium to high capital costs. They are sensitive to variations in gas quality.



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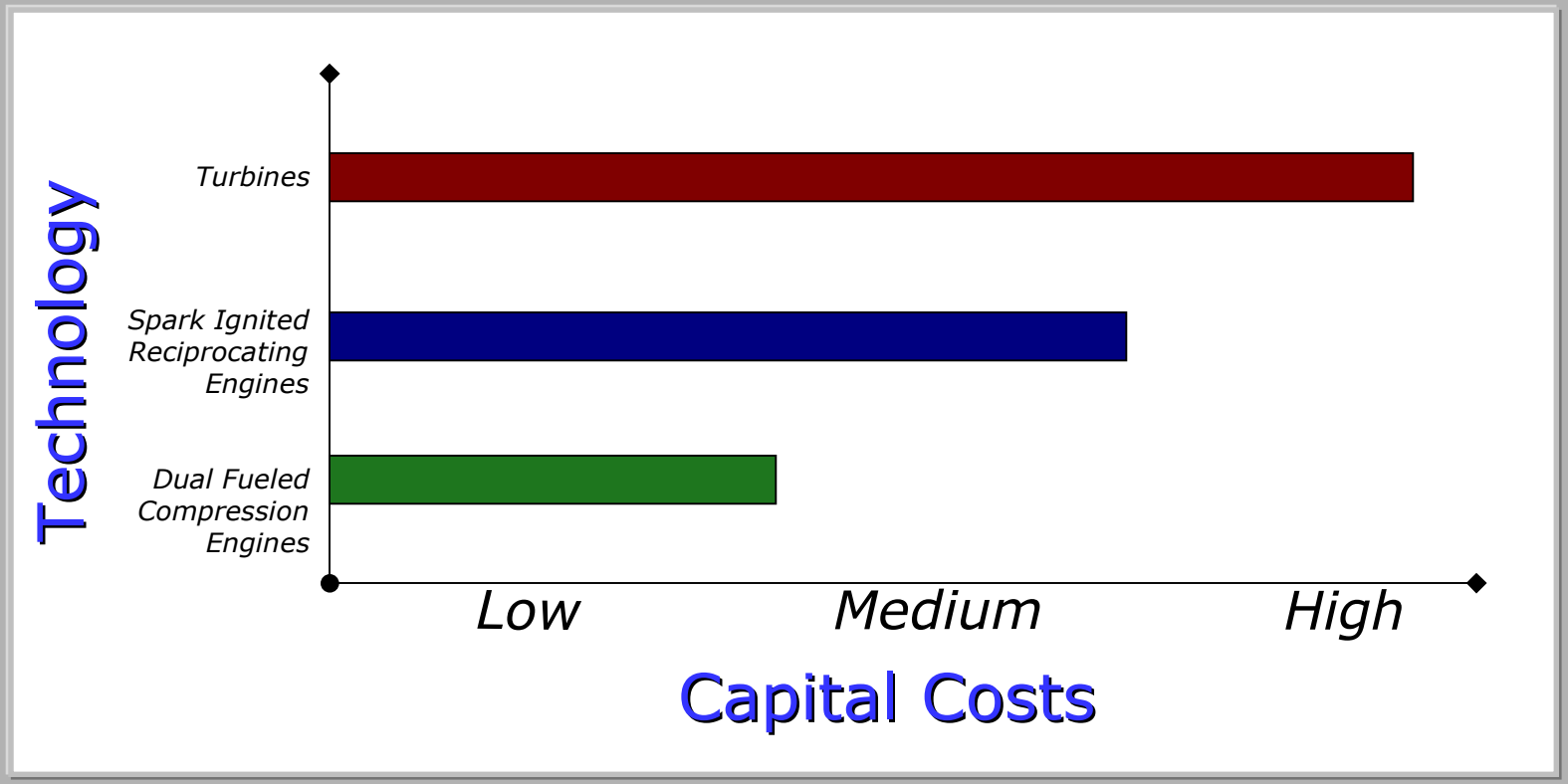
Capital Cost Comparison

Dual fueled, compression ignition diesel engines offer the lowest capital costs. Operation is independent of gas quantity or quality.



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Dual Fueled Technology Benefits

- **Lower Capital Cost**
- **Efficient**
- **Highly Reliable**

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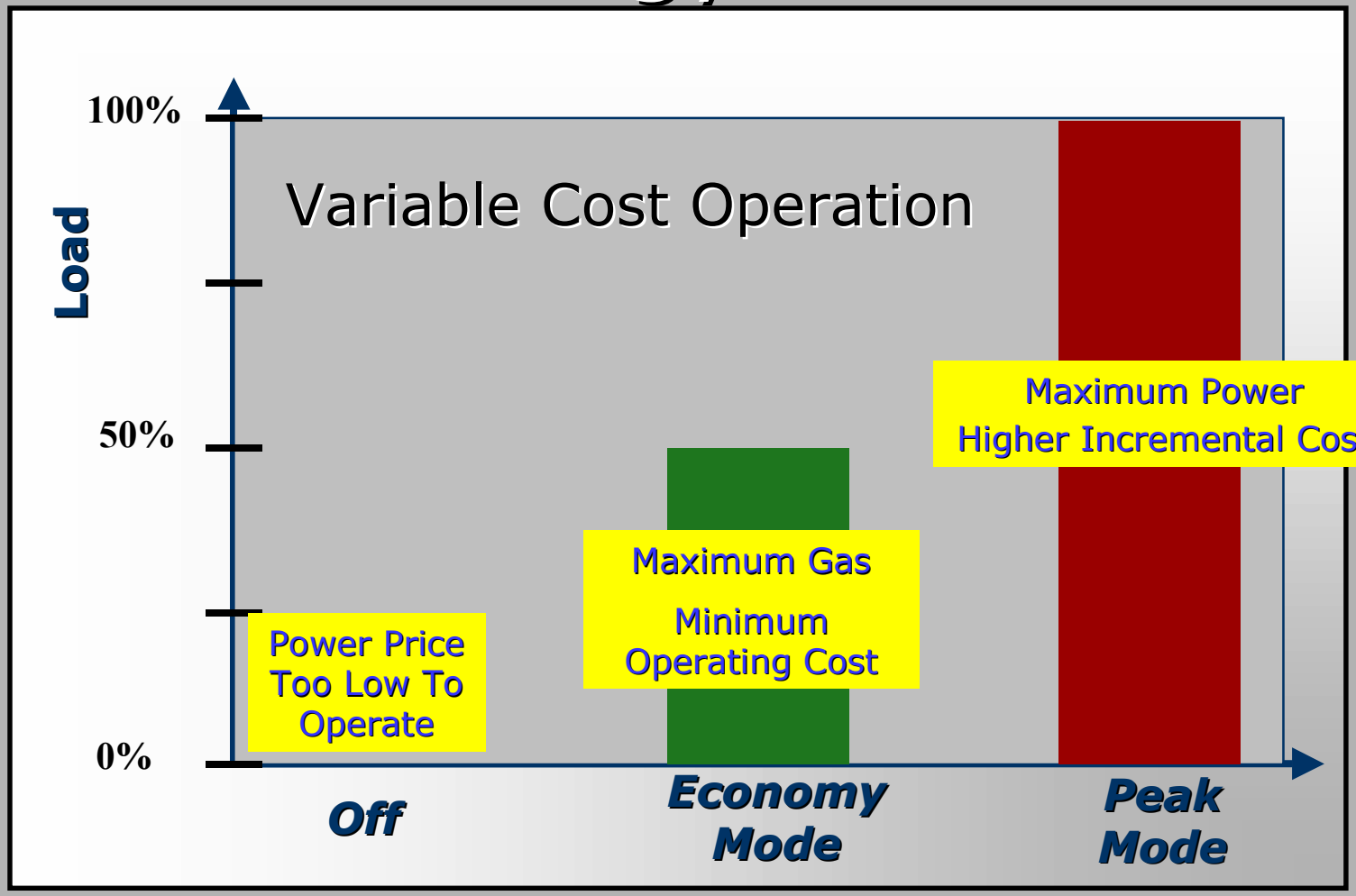
Dual Fueled Technology Benefits



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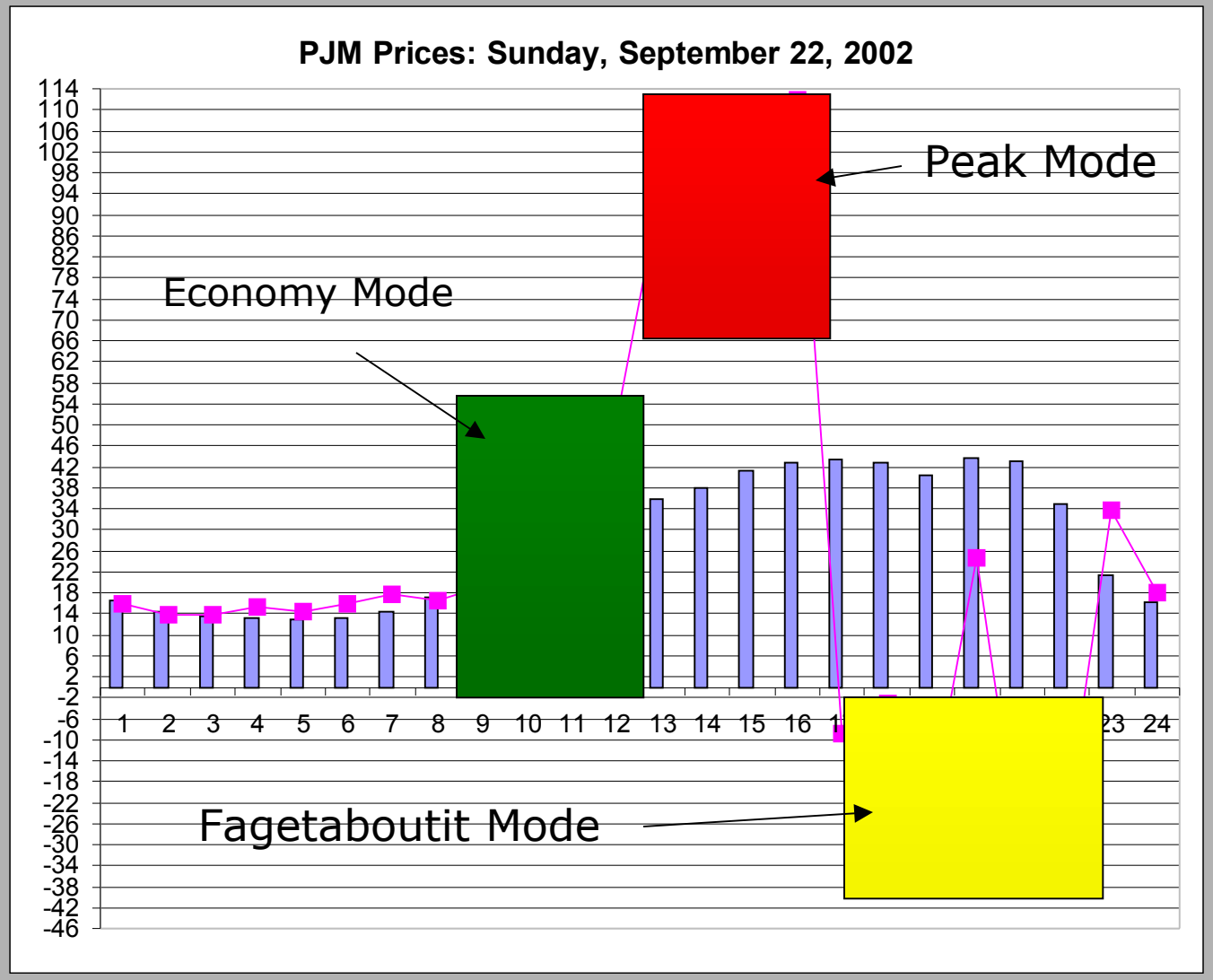

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Secret Production Methods

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